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Optimization of a heralded single-photon source with spatial and temporal multiplexing

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Abstract

© Published under licence by IOP Publishing Ltd. The properties of a heralded single-photon source with temporal and spatial multiplexing are studied with the aim to maximize its efficiency for a given value of the second-order zero-time autocorrelation function. We show that the variable time delay, which is used for temporal multiplexing, can be optimized so that the mean number of photon passes through the switches and the total number of switches are respectively reduced to ~ log2N and ~ (1/2)log2N, where N is the temporal multiplexing degree. The total efficiency of such an optimized source is calculated for typical switching losses and the autocorrelation function is calculated in the presence of the detector dark-count noise.

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